

AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.



Amateur Satellite Report is endorsed by the American Radio Relay League as the special interest Newsletter serving the Amateur Radio Satellite Community

Number 76
May 14, 1984

Editor: Vern Riportella, WA2LQQ
Contr. Editor: George Johnson, W0MD
Harold Winard, KB2M

Managing Editor: Bob Myers, W1XT

Copyright 1984 by Amateur Satellite Report
(See last page for details)

Mode L Progress Report

by William D. McCaa, Jr. K0RZ

There have now been 88 stations reported active on Mode L. Most of the activity occurs between 436.48 and 436.58 MHz.

The beacon continues to intermodulate the downlink signal. Comparing the transponder signals to when the beacon is keydown in the cw mode, the signals in the pass-band are 12 dB weaker with key up and 6 dB weaker in the PSK telemetry mode.

Many stations are using low power. Their sub-1 kW ERP signals are heard up to 30 dB below the beacon. The transponder throughput is non-linear as well inasmuch as a 10 dB change in the input signal results in a 15 dB change in the output. The PSK signalling produces sidebands on the downlink. It is believed the Mode L HELAPS power amplifier is running in Class C operation as a consequence of a failed bias transistor.

Notably, the transponder and beacon signals are stronger when the Mode L transponder is first activated one hour prior to apogee on Wednesdays and Saturdays. The strength subsides by as much as 15 dB on the transponder and 10 dB for the beacon during the course of the two hour Mode L operation. This phenomenon has been routinely observed over the past 8 weeks. Upon Mode L commencement the signal levels are generally about 8 dB stronger than they had been in the past but by the end of the two hour period they have reverted to their former levels.

The secret of consistent Mode L operation is still to be found in a superior 436 MHz receive antenna system. A minimum of 20 dBd gain should be sought if favorable results are to be obtained. A low noise preamp (< 1.0 dB NF) mounted at the antenna is strongly recommended. On the uplink, 10 kW ERP is sufficient.

The station at K0RZ presently comprises 2 x 38 element loop Yagis at 24 cm (horizontal polarization) and 8 x 15 element NBS Yagis (horizontal) at 70 cm. A low noise GaAsFET on 70 cm insures satisfactory reception.

Answers Sought For Curious Anomaly

The very popular Yaesu FT-726R VHF/UHF transceiver is the current focus of attention in an effort to learn the cause

of a curious i-f anomaly. According to W3IWI, the problem manifests when using the FT-726R for sending FSK packet radio. He suspects the difficulty may be attributed to a 455 kHz ceramic filter (LF-C2A). There are two types of filters supplied. The other is a CFM-455. W3IWI indicates he will be testing the filters on a network analyzer in order to establish a basis for the apparent asymmetry which affects FSK transmission. His findings will be reported here.

On a related note, N0AN has found an apparent cause for the low ssb output observed by many on the same radio, the FT-726R. According to N0AN, the combination of the microphone supplied and the AGC circuit time constant results in inappropriate AGC action to roll back the output. The result is less than full output from the rig. He goes on to suggest a simple solution involving the addition of a small capacitor to change the AGC attack time. N0AN reports he has recommended the solution to about a dozen -726R owners who have been most pleased with the result.

Yaesu's Vice President in Los Angeles, Chip Margelli, K7JA, has been advised of both situations. Yaesu will be investigating he advises.

The FT-726R has quickly established a sizeable market share especially in the satellite market. The rig can be configured to operate full duplex for Mode A and Mode B satellites. User reports to ASR have been very favorable to date. Yaesu-Musen donated a full-equipped FT-726R to AMSAT for the member recruitment drive this past spring.

New Launch Opportunity Sought

AMSAT is negotiating for a major new launch opportunity targeting the early 1986 time frame. The payload capacity will be quite large allowing launch of a payload at least as large as AMSAT-OSCAR 10 (formerly Phase IIIB).

If obtained from the launch authorities, the launch opportunity could be used to orbit Phase IIIC, similar in design to the successful AO-10 satellite now approaching its first birthday. Although the low inclination of AO-10's orbit has affected its overall performance, it seems on its way to becoming the most popular OSCAR ever. Phase IIIC will build on its predecessor's technology. However, there may be some additions too. According to a preliminary report by AMSAT DL Vice President Werner Haas, DJ5KQ, the

Phase IIIC bird may contain a Mode L digital transponder in addition to the Mode B and Mode L linear transponders. There is also the suggestion by Werner of a 2.4 GHz S-band beacon by DC9RK.

The year 1986 could very well be a very productive one as regards OSCAR launches. Besides Phase IIIC, if a launch is obtained, the year could see the French Arsene, the Japanese JAS-1 and the digital store-and-forward PACSAT satellite all launched. PACSAT is explained in an excellent, current article in the best-selling computer magazine, BYTE. Besides these birds, a new Radio Sputnik or two during 1986 would not surprise.

Meanwhile, very preliminary discussions concerning the possibility of a constellation of geo-stationary amateur radio satellites surfaced at the recent Dayton Hamvention in the U.S. As envisioned, at least three Mode B/L satellites would be positioned at strategic locations to provide coverage of major regions. With appropriate interlinking (either satellite-to-satellite or via powerful terrestrial relays) global coverage could result. Mode "S" (at 2.4 GHz) experimental mode might also be included in the projected 1986-87 time frame.

AMSAT emphasized the conjectural nature of discussion at this very early stage of discussion but felt a reckoning of sentiment for this type of project within the potential user community is appropriate. They emphasize that much conceptual work need be done before even preliminary planning can commence. Thus for the present the discussions seem to be of the "what if" character.

One critical element is user support. The geo-stationary option is a very costly and potentially risky one. On the one hand an ambitious project could conceivably absorb most of the world's satellite designing/building talent and a similar quantity of its fiscal resources. On the other hand it could be the spark which ignites the general amateur radio community's interest in space community. The latter effect could generate hitherto undreamt of income to be plowed into new space hardware and projects. The geo-stationary option, Phase IV, cannot be seriously contemplated without early, broad support from the world amateur radio community. It will take unprecedented support in dollars and manpower.

Should such an option be considered seriously? What

Kaz Deskur, K2ZRO, Silent Key

It is with deepest sorrow that ASR notes the passing of a dear friend and colleague. Kaz Deskur, K2ZRO, of Endicott, New York succumbed on 23 April.

His was one of the most easily recognized calls in AMSAT. But notoriety was not his goal. Developing new graphic satellite tracking aids *did* make him famous nevertheless. His Satellabe, introduced in the mid-seventies, quickly became the standard by which other similar devices were measured.

Likewise, his character and motivation formed a standard for others to emulate. Anecdotes of his selfless, generous nature abound. Our favorite is one which tells of how he received a letter from a Polish ham who sought to emigrate to the U.S. but knew no one to sponsor him and his family. He learned of Kaz through ham radio, wrote a letter to Kaz and was delighted with the result. Not only did Kaz agree to sponsor the immigrant, but Kaz actually put him and his family up in the Deskur home for a year.

In fact his character transcended our hobby and he had become a genuine hero to many who knew him. There are tales of his World War II exploits as an underground radio operator in war-torn Poland. Under Nazi death sentence for his commando work he twice escaped the executioner's bullet.

One of the earliest satellite afficiandos, K2ZRO became one of the first to receive a coveted Sputnik QSL. Later he became highly active on AMSAT-OSCAR 6. He earned DXCC 300 +, WPX Honor Roll and the CHC Arne Trossman trophy for having earned over two hundred awards in ham radio.

Kaz's interest in ham radio involved public service too. He was active in emergency communications in southern New York. He was AMSAT's Area Coordinator for Southern New York. He appeared at

numerous conventions and hamfests in AMSAT's behalf.

As ASR noted in its June 1, 1981 edition which spotlighted K2ZRO, perhaps it was the war-engendered crisis which spawned his wry wit. Always quick with a laugh and cheerful at heart, he was a source of constant inspiration to those around him. He was highly energetic and respected for his ingenuity in his professional career with IBM. His long-time employer, IBM recognized Kaz on several occasions for his inventiveness and resourcefulness.

K2ZRO became known to AMSAT members through his popular Satellabe and recently his unique Satellipse. His regular column appeared in *Orbit* magazine. Kaz regularly scanned dozens of foreign magazines seeking material for his well-liked column. A frequent contributor to the progenitor *AMSAT Quarterly Newsletter*, he also authored articles for 73 magazine.

Kaz is survived by wife Sofie, three sons and a daughter. Two sons, Andy (KA1M) and Ed (WA2DFY) followed their Dad's footsteps and became hams. Andy and Sofie say they will continue the ZRO Technical Devices business (Satellipse) that Kaz founded.

The funeral was held in Endicott, New York on 26 April. AMSAT sent flowers on behalf of all Kaz's AMSAT friends. The family has requested that donations in Kaz's memory be made either to AMSAT or the American Cancer Society.

We know with certainty that few of his kind will pass this way. Thus the more poignant is his passing. We benefitted in knowing him. He touched us deeply; he is missed dearly and will n'er be forgotten. Courage. Here cracks a noble heart.

sources of financing should be explored? Tapped?

Interested individuals are encouraged to air their views (preferably in writing to AMSAT). Based on an assessment of supportability and an initial feasibility study, AMSAT will try to establish a baseline viability for this conjecture. Phase IV may be out of reach for several years to come or the Amateur Radio community may get behind the concept and help leap-frog itself into a vastly more advanced posture. Is this the first leap?

Short Bursts

- A new packet radio DX record has apparently been set. The old record set on 10 meters involved ZL1AOX and WA2LQQ who communicated via the digital mode last summer for a 300 km. The new record belongs to VK2AQG (near Sydney) and W3IWI near Washington. The new packet DX record of 15,700 km was set 6 May using AO-10 near apogee. In related news, PY2BJO and JA1ANG are close to operational on packet. Several ZS stations are thought to be close as well thanks to the efforts of ZS6AKV and KE3D/ZS1FE.
- KO5I will again be heading for the hills when he puts Arkansas on the air via AO-10 over the Memorial Day weekend, 26-27 May. Watch for this rare grid square!
- The AMSAT-Stoner Challenge Cup competition is picking up steam. The event is being worked worldwide. Some stations are approaching 500 contacts as not quite one third of the competition period has elapsed.
- KO5I of AMSAT and W9KDR of ARRL confirm that AO-10 WILL be available for Field Day use this June. Normal schedule will be observed including the regular Mode L schedule on Saturday.
- G8NEF reports UO-11 recovery efforts continue in earnest. Roger points out (with regard to ASR #75) that several avenues are being pursued and that there is no positive indication of watchdog timer efficacy at present. Motivation to recover from the present dilemma is high, he reports, and progress reports are regularly posted on the UO-9 bulletin board.

Susan Champa, Daughter of K8OCL, Cited For Rocket Fuel Project

Miss Susan Champa, daughter of Dr. and Mrs. John Champa of Piketon, Ohio, has been cited by the Ohio Academy of Science for her high school science project involving rocket propellants. A junior at Zane Trace High School in Kingsington, Ohio, Miss Champa analyzed and classified various rocket fuels in terms of their chemical system and effectiveness.

The award was made in connection with the science fair held in late March. Miss Champa is in a college preparatory curriculum. She intends to study the physical sciences in college.

John Champa, Susan's father, is K8OCL, AMSAT's Senior Vice President.

New Equipment Tempts Dayton Attendees

Several new items targeting the amateur satellite enthusiast debuted at the Dayton Hamvention last week. The casual observer was teased by new arrays of aluminum, splendid little black boxes and an assortment of goodies bound to deplete the cash reserves.

KLM/Mirage had new active and passive hardware on display. The KLM 1200DF 1.26 GHz transverter features 5 watts out on both 1296 and 1269 MHz with bandswitching between the two. The i-f is at 2 meters. The new KLM 144-22C 2 meter crossed Yagi provides notable improvement over the -16C and -14C according to the spec sheet supplied. Gain claimed is a mighty respectable 13.1 dBic. It's big too. A gigantus elevation system called the EL 3000 Moontracker could likely torque a Volvo across the ecliptic, not to mention a typical EME array. The sturdy device is designed for the very largest of OSCAR arrays and most EME-type aluminum assemblages.

New from Europe is a handsome 70 cm helix from DJ2UT of Sommer GmbH of Denzlingen. (Distributed by Eurotechnik, W1LJ, P.O. Box 843, Plainville, CT 06062). Claimed is 16 dBi on a boom length of 6.6 feet (2 meters). The sturdy-appearing structure is made to endure, it's evident.

Advanced Receiver Research had its new in-line GaAsFET preamp line on display. The two-meter version can handle 25 watts and is designed to be left in circuit. It senses rf from the transmitter and switches the GaAsFET out in transmit mode to protect the sensitive device from damage.

Spectrum International showed their complete line of premium imported Microwave Modules. New was the 24 cm transmit converter, the MMX-1268-144. S.I. donated this unit to AMSAT for the member recruitment drive. The unit was won by WD4FAB.

Spectrum West showed new imported rotors for OSCAR use. Unconfirmed reports suggest S.W. has merged with AEA, also from the Washington (state) area.

The VHF Shop of Mountain Top, PA, had some gorgeous UHF "trinkets" on display including 2C39 amplifiers for 24 cm, Mode L use. New water cooling jackets for the 2C39's were offered. The VHF Shop is stocking a wide assortment of advanced VHF/UHF supplies of interest to OSCAR users.

Similarly, KJI electronics, another Orbit advertiser, displayed the latest in Lunar, ICOM, KLM and Mirage equipment. KJI was one of the first to have the new KLM-22C antenna available from stock.

Cushcraft had its new 70-cm crossed Yagi on display. A representative suggested the veteran 2-meter crossed Yagi might be a candidate for update as well.

Hy-Gain/Telex indicated strongly a desire to produce a viable OSCAR antenna system. Representatives at their booth were most anxious to learn of long-term AMSAT planning.

No major new transceivers were obvious to the casual viewer.

And we probably missed a few new entrants along the route as well.

oscar-9:
Wed May 9 00:56:06.871 1984 UTC: Ascending node at 137.0 west
Nodal period: 94.45032 min
Longitude increment: 23.610533 deg w/orbit
Element set 625, epoch: Thu Apr 26 09:06:18.230 1984 UTC

oscar-11:
Wed May 9 00:42:33.498 1984 UTC: Ascending node at 46.8 west
Nodal period: 98.56316 min
Longitude increment: 24.639881 deg w/orbit
Element set 23, epoch: Tue Apr 24 09:15:58.549 1984 UTC

rs-5:
Wed May 9 00:27:24.121 1984 UTC: Ascending node at 69.3 west
Nodal period: 119.55358 min
Longitude increment: 30.015366 deg w/orbit
Element set 161, epoch: Sat Apr 21 10:02:02.492 1984 UTC

rs-6:
Wed May 9 01:54:46.975 1984 UTC: Ascending node at 99.1 west
Nodal period: 118.71565 min
Longitude increment: 29.805713 deg w/orbit
Element set 79, epoch: Tue Apr 24 03:47:13.189 1984 UTC

rs-7:
Wed May 9 01:05:53.326 1984 UTC: Ascending node at 82.4 west
Nodal period: 119.19481 min
Longitude increment: 29.925569 deg w/orbit
Element set 153, epoch: Sun Apr 22 03:50:08.39 1984 UTC

rs-8:
Wed May 9 01:16:18.343 1984 UTC: Ascending node at 79.7 west
Nodal period: 119.76289 min
Longitude increment: 30.067704 deg w/orbit
Element set 271, epoch: Sun Apr 22 10:03:44.292 1984 UTC

Satellite: rs-7
Catalog number: 13001
Epoch time: 84113.15981527
Sun Apr 22 03:50:08.39 1984 UTC
Element set: 153
Inclination: 82.9660 deg
RA of node: 170.3915 deg
Eccentricity: 0.0022824
Arg of perigee: 145.0116 deg
Mean anomaly: 215.2468 deg
Mean motion: 12.08681023 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 10350
Semi major axis: 8017.746 km
Anom period: 119.138133 min
Apogee: 1664.827 km
Perigee: 1628.227 km

Satellite: rs-5
Catalog number: 12999
Epoch time: 84112.41808440
Sat Apr 21 10:02:02.492 1984 UTC
Element set: 161
Inclination: 82.9598 deg
RA of node: 174.1256 deg
Eccentricity: 0.0010064
Arg of perigee: 209.3583 deg
Mean anomaly: 150.6871 deg
Mean motion: 12.05051732 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 10310
Semi major axis: 8033.847 km
Anom period: 119.496945 min
Apogee: 1668.850 km
Perigee: 1652.680 km

Satellite: oscar-10
Catalog number: 14129
Epoch time: 84097.34280771
Fri Apr 6 08:13:38.586 1984 UTC
Element set: 97
Inclination: 25.7059 deg
RA of node: 206.1228 deg
Eccentricity: 0.6092647
Arg of perigee: 260.5025 deg
Mean anomaly: 30.1701 deg
Mean motion: 2.05857411 rev/day
Decay rate: -1.42e-06 rev/day²
Epoch rev: 613
Semi major axis: 26105.470 km
Anom period: 699.513315 min
Apogee: 35636.380 km
Perigee: 3826.098 km
Beacon: 145.8100 mhz

Satellite: rs-8
Catalog number: 12998
Epoch time: 84113.41926265
Sun Apr 22 10:03:44.292 1984 UTC
Element set: 271
Inclination: 82.9641 deg
RA of node: 175.3940 deg
Eccentricity: 0.0017736
Arg of perigee: 264.7978 deg
Mean anomaly: 95.1076 deg
Mean motion: 12.02944541 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 10304
Semi major axis: 8043.232 km
Anom period: 119.706267 min
Apogee: 1700.244 km
Perigee: 1671.713 km

Satellite: rs-6
Catalog number: 13002
Epoch time: 84115.15779154
Tue Apr 24 03:47:13.189 1984 UTC
Element set: 79
Inclination: 82.9640 deg
RA of node: 164.9130 deg
Eccentricity: 0.0051413
Arg of perigee: 118.5184 deg
Mean anomaly: 242.1073 deg
Mean motion: 12.13561308 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 10416
Semi major axis: 7996.223 km
Anom period: 118.659024 min
Apogee: 1675.152 km
Perigee: 1593.230 km

Satellite: oscar-11
Catalog number: 14781
Epoch time: 84115.38609432
Tue Apr 24 09:15:58.549 1984 UTC
Element set: 23
Inclination: 98.2497 deg
RA of node: 177.7373 deg
Eccentricity: 0.0014838
Arg of perigee: 93.1724 deg
Mean anomaly: 267.1177 deg
Mean motion: 14.61850345 rev/day
Decay rate: 2.52e-06 rev/day²
Epoch rev: 784
Semi major axis: 7062.423 km
Anom period: 98.505295 min
Apogee: 715.638 km
Perigee: 694.680 km
Beacon: 145.8250 mhz

Amateur Satellite Report is published and mailed First Class bi-weekly for the Radio Amateur Satellite Corporation. The purpose is to enhance communications about the Amateur Radio Satellite Program. Subscription rates for the United States, Canada, and Mexico are \$22.00; Foreign is \$30.00. The rate covers 26 issues (typically one year). Send check or money order in U.S. funds (drawn on U.S. banks only please) to "Satellite Report," 221 Long Swamp Road, Wolcott, CT 06716. Information contained herein may be quoted without permission provided credit is given to Amateur Satellite Report, Wolcott, CT 06716. Amateur Satellite Report is Copyright Protected and duplication of this publication in any way including by the photocopy process or by electronic means (computer data banks, etc.) is not permitted under any circumstances. Amateur Satellite Report is endorsed by the ARRL as the special interest newsletter serving the Amateur Radio Satellite Community. The editorial opinions expressed are not necessarily those of the ARRL.